KENYA NATIONAL DEVELOPMENT PROGRAMME

Energy and Power Infrastructure

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The National Energy Vision

WORKING DOCUMENT — IN PROGRESS. Architecture and philosophy complete. Sections marked [FORTHCOMING] are pending completion.

A twenty-year programme to build Kenya from 2,200 MW of reliable generation to 13,930 MW of installed capacity — geothermal as the backbone, solar embedded in every structure, hydro unlocked from the water programme, wind from the northern corridor — making Kenya a power-surplus nation and the EAC's primary electricity exporter by Year Eight, while delivering the competitive industrial tariff that every other programme document assumes.

Kenya National Development Programme | Energy and Power Directorate | Year One

Preamble

Every document in the Kenya National Development Programme assumes power. The steel plant at Dongo Kundu needs 400-600 MW of continuous, ultra-reliable industrial electricity to be competitive. The seven Housing Production Centres need reliable power for their pre-cast manufacturing lines. The Galana-Kulalu irrigation scheme needs electric pumps drawing 400-800 MW across its full extent. Every Community Recreation Centre needs power for its pool, its floodlights, its digital terminals, and its library. Every school, every hospital, every CRC, every water treatment plant, every ArdhiSasa data centre, every railway signalling system —

they all assume a functioning national grid at competitive prices. None of them can deliver without it.

Kenya's current reliable generation capacity is approximately 2,200 MW against peak demand of approximately 2,000 MW. The national programme — working backward from every sector document's load requirements — needs approximately 9,000-10,000 MW of demand capacity by Year Ten. Kenya must build approximately 7,000-8,000 MW of new generation capacity in ten years while simultaneously transforming its transmission infrastructure, reforming its regulatory architecture, delivering rural electrification to the remaining 25% of unconnected households, and reducing its industrial electricity tariff from USD 0.13/kWh to USD 0.05/kWh.

This is achievable. Kenya has extraordinary energy resources — geothermal that is among the world's best, wind that is among Africa's strongest, solar that is abundant across most of the country, and a water programme that creates hydropower assets as a byproduct of its primary water storage purpose. The constraint has not been resources. It has been capital, institutional fragmentation, and the absence of a plan that integrates the generation, transmission, distribution, and regulatory dimensions into a single coherent programme.

The Three Strategic Choices
CHOICE ONE — Geothermal as backbone: Kenya's geothermal resource is its most valuable energy asset. Reliable, baseload, no fuel cost, Kenyan-controlled. The programme expands it from 860 MW to 4,660 MW by Year Twelve. Every other generation source is built around this baseload foundation.
CHOICE TWO — Solar as infrastructure: Solar is not a special energy initiative. It is a standard element of every public building constructed under the national programme. Every school, hospital, CRC, university, government office, and industrial facility is built with rooftop solar as part of the KSBC construction standard. This embeds 2,100 MW of distributed generation into the construction programme at marginal additional cost.
CHOICE THREE — No coal: Kenya does not build coal-fired power generation. Not because of international pressure — though that exists — but because the economics are wrong. A coal plant built today would operate for 30-40 years. Within that timeframe coal becomes uncompetitive against solar and wind almost everywhere. Kenya would be locking in expensive, polluting, stranded-asset risk when it has world-class clean resources. The Mui Basin coal, if extracted, is for export and for coking in the steel process — not for power.

SECTION ONE

The National Programme Load — What Kenya Actually Needs

1.1 Load Requirements by Sector

The programme demand assessment works backward from every sector document. This is not conventional energy planning — which extrapolates from historical growth — but programme-led demand assessment: what does each vision document require, where, and when?

Sector	Additional Load by Year 10 (MW)	Primary Driver
Industrial — steel, HPCs, SEZ, agro-processing, KISC integrated mill	1,500	Dongo Kundu EAF steel plant 400–600 MW (existing). KISC integrated blast furnace + BOF + rolling mill: 600–900 MW additional when operational Year 7. HPCs 50–100 MW. Agro-processing zones 200–400 MW. KISC's green steel hydrogen injection from Year 15 is powered by electrolysis — additional 200–400 MW at full scale.
CRCs and culture/sports infrastructure	800	400 urban CRCs at average 2 MW load. 290 rural CRCs at 0.5 MW. Pool heating and filtration is the largest single CRC load.
Universities and TVET colleges	850	68 universities at 5–10 MW each. 400 TVET colleges at 0.5–2 MW. Laboratory and research equipment dominant.
Schools — 47,000 public schools	500	Average 15 kW per school at full specification. Computer labs, water pumps, ECD centres, school kitchens.
Water — KWCMC infrastructure (desalination, treatment, distribution)	900	Coastal desalination plants (6 centres, Mombasa 300,000 m³/day anchor): 400–600 MW — the largest single KWCMC load, made viable only by geothermal at USD 0.05/kWh. Water treatment plants nationally: 50–100 MW. KWCMC distribution pump systems: 100–150 MW. Hydrological Intelligence Unit sensor network and Community Water Trust digital management: 30–50 MW.

Sector	Additional Load by Year 10 (MW)	Primary Driver
Agriculture — KLIC irrigation schemes + KAERS + Ward Cooperative Facilities	850	Galana-Kulalu full irrigation pumping (400,000 ha at full development): 400–800 MW — the largest single agricultural load and the reason KLIC and Nishati must plan together. Other KLIC irrigation schemes (Ewaso Ng'iro, Turkwel, Tiva): 100–200 MW. KAERS 7 regional demonstration farms + digital platform: 5–10 MW. Ward Cooperative Facilities (1,450 nationally): cold stores (solar primary, grid backup) 50–80 MW national. County Aggregation Facilities (47): 20–30 MW. Note: Ward Cooperative cold stores are designed solar-first — they reduce grid load while providing food security.
Kenya Railway Corps — traction, workshops, stations, signalling	600	The KRC network at 4,572km standard gauge requires: traction power for electric locomotives on high-density corridors, station operations (lighting, climate control, ticketing systems), signalling and telecommunications across the full network, workshop power at Isiolo Inland Depot and four Training Command facilities. The KRC electrification mandate — as per the KRC Atlas — targets all high-density corridors by Year 8.
Kenya National Ambulance Corps — dispatch centres, charging, cold chain	85	National Emergency Operations Centre: 24-hour operation, redundant power supply. 47 county dispatch commands. 290 sub-county centres. Air wing bases (helicopter servicing). Vaccine cold chain co-location with KNAC bases where health infrastructure is shared. Electric ambulance vehicle charging at all base locations (programme specifies EV transition by Year 7).
Settlement Maintenance Corps — mechanical fleet, Academy, ward bases	120	Settlement Maintenance Academy (co-located with Water Corps Academy): workshop, classrooms, residential. Ward Maintenance Unit bases in every

Sector	Additional Load by Year 10 (MW)	Primary Driver
		ward of every city (150+ locations in Nairobi alone). Mechanical fleet charging: electric sweeper trucks, hoover trucks, collection vehicles. River patrol boat charging. Retention pond gate management systems.
Housing — construction and new residential	350	Construction equipment and HPC operations. 2 million new electrified homes by Year Ten at 50–100 kWh/month each.
Health infrastructure — five-level hierarchy	250	Level 3 sub-county hospitals (290): surgical theatres require 99.95% power reliability — each facility needs grid + UPS + generator with 7-day fuel. Level 4 county referral (47): advanced imaging, ICU. Level 5 national referral (3): neurosurgery, cardiac, oncology. NHIF digital backbone. CHP motorcycle charging at all ward dispensaries.
Digital infrastructure — data centres, fibre	175	National data centre for ArdhiSasa, governance dashboard, government cloud. KECA 48-hour contract publication platform. Kenya Energy Tribunal digital filing system. Film studio and creative industries.
Agriculture processing and cold chain	225	Pre-cooling and cold storage at cooperative hubs. Coffee, tea, and flower processing.
Creative industries — studios, broadcasting	50	Kenya Film Studio sound stages. EABU broadcasting. National Recording Studios.
Programme additional demand subtotal	6,455 (revised — KLIC irrigation separated from KWCMC water, Ward Cooperative facilities added, KAERS added)	
Organic growth —	1,500	Rising household incomes and

Sector	Additional Load by Year 10 (MW)	Primary Driver
population and income		urbanisation independent of programme.
Current peak demand	2,000	Baseline.
TOTAL DEMAND BY YEAR TEN	9,955 (revised)	Working figure for generation programme sizing. The 13,930 MW installed capacity target provides approximately 4,000 MW headroom above projected peak demand — essential for EAC export, variable renewable management, and demand growth beyond Year Ten.

The programme targets 13,930 MW of installed capacity by Year Ten — a surplus of approximately 4,800 MW above projected peak demand. This surplus is not waste. Variable renewable sources (solar and wind) are not available at full capacity at all times, so effective firm capacity is lower than installed capacity. The geothermal backbone (4,660 MW at 90%+ capacity factor) and the pumped storage (1,000 MW fully dispatchable) provide the reliable foundation. The surplus renewable capacity provides the headroom for the EAC export programme and for demand growth beyond Year Ten.

SECTION TWO

Geothermal — The Crown Jewel

2.1 The Resource

Kenya sits on the East African Rift System, one of the world's most significant geothermal provinces. The confirmed geothermal resource in Kenya's Rift Valley corridor is estimated at 10,000 MW. The probable resource is 15,000-20,000 MW. Kenya currently uses 860 MW of it. This is the energy equivalent of discovering you are sitting on one of the world's largest oil fields and choosing to extract 8% of it. The programme corrects this.

Geothermal has characteristics that make it uniquely valuable in Kenya's generation mix. It is baseload — available 24 hours per day, every day, regardless of weather. Its capacity factor exceeds 90%, the highest of any generation technology. It has no fuel cost and no fuel import risk. Once drilled and developed, the resource is Kenyan and

permanent. The cost of geothermal electricity falls as scale increases because the fixed infrastructure is amortised across more output.

Development Tranche	Fields	Capacity	Timeline
Tranche 1 — Olkaria Expansion	Olkaria V (under development), Olkaria VI (planned), Olkaria VII and VIII (new)	500 MW additional. Total Olkaria: 1,360 MW	Years 1–5
Tranche 2 — Menengai and Suswa	Menengai (GDC programme accelerated and expanded), Suswa field south of Nairobi (new development)	800 MW additional	Years 3–8
Tranche 3 — Northern Rift	Baringo-Silali and Korosi-Chepchuk fields. Requires Northern Ring transmission infrastructure to be in place first.	1,500 MW additional	Years 5–12
Existing capacity	Olkaria I–IV plus other existing fields	860 MW (current)	Operational
TOTAL GEOTHERMAL BY YEAR TWELVE	All fields	4,660 MW	Progressive

The institutional design reform is as important as the drilling programme. The Geothermal Development Company is separated from KenGen and given a dedicated capitalisation and a mandate to drill at industrial scale. GDC drills the wells and sells steam to KenGen and private IPPs who build the power plants. This separation of upstream drilling from generation enables both to be optimised independently: GDC focuses on fast, efficient well drilling; generation companies compete to build the most efficient power plants against GDC's steam supply. Private investment in generation is possible without requiring private investors to take on the geological drilling risk, which is the primary barrier to private geothermal investment.

SECTION THREE

Solar — Built Into Every Structure

3.1 The Solar Infrastructure Mandate

Solar is not a special green initiative in this programme. It is a standard element of every public building constructed under the national programme — as standard as a roof drain or an electrical main. Kenya's solar irradiation across most of the country is excellent. Every public building is a solar opportunity. The KSBC construction standard is updated to make rooftop solar a mandatory specification element for all new public buildings above 200 square metres of roof area.

Building Category	Solar Specification
Community Recreation Centres (urban)	Minimum 200 kW rooftop array. 100 kWh battery storage. Grid connection for backup and export. Solar covers daytime base load including pool heating; grid covers peak evening demand. Each urban CRC is a net electricity exporter to the grid on sunny weekdays.
Community Recreation Centres (rural)	Minimum 50 kW rooftop array. 50 kWh battery storage. Mini-grid connection where grid is unavailable. This is the primary electrification mechanism for rural sub-county centres not yet grid-connected.
Schools — all 47,000 public schools	Minimum 20 kW per school as KSBC standard specification. Computer lab, lighting, water pump, and ECD centre powered by school solar array. Schools in areas without grid connection are fully solar-powered with battery storage. Target: every school with reliable electricity by Year Five.
County hospitals and health facilities	Minimum 200 kW at Level 4 hospitals. Minimum 50 kW at Level 3 facilities. 200 kWh battery storage for surgical suite power continuity. A hospital that loses power during surgery because the solar array is undersized is a design failure, not a natural event.
Universities	Minimum 500 kW per university campus. Larger for universities with significant laboratory and research equipment load. The university agricultural enterprise programme generates additional solar capacity from farm structures.
Industrial buildings	All buildings above 1,000 sq m in national programme industrial zones install rooftop solar as a condition of industrial zone licence. Dongo Kundu SEZ target: 300 MW of rooftop solar across the full developed zone.
New housing blocks (Nyumba ya Taifa)	All blocks above 20 units install rooftop solar on common areas and roof. Output feeds common services — lighting, water pumps, lifts. Surplus exported to grid.

The aggregate capacity from the solar infrastructure mandate across all national programme buildings: approximately 2,100 MW. This is distributed generation built as part of the construction programme — not requiring a separate energy procurement process, not requiring a dedicated transmission line, not requiring a power purchase agreement negotiation. It is simply the way public buildings are built from Year One onward.

3.2 Utility-Scale Solar — The ASAL Advantage

The ASAL regions of Kenya — Turkana, Marsabit, Garissa, Isiolo, Kajiado — have some of the highest solar irradiation in the world. Land is available at very low cost. The Northern Ring transmission infrastructure (Section Five) connects this generation to the national grid and to the load centres. Utility-scale solar at ASAL sites is now the cheapest electricity generation technology in the world at USD 0.02-0.04 per kWh for plant-gate cost.

Solar Park	Location	Target Capacity
Garissa Solar Park (expansion)	Garissa — existing 55 MW facility expanded	500 MW by Year Six
Turkana Solar Park (new)	Adjacent to Turkana Wind Power, northern corridor	600 MW by Year Seven
Marsabit Solar Park (new)	Marsabit — highest irradiation in Kenya	400 MW by Year Eight
Kajiado Solar Park (new)	Southern Rift — close to Nairobi load centre	800 MW by Year Six
Kilifi Coastal Solar Park (new)	Coast Region — serves Mombasa industrial load	400 MW by Year Seven
TOTAL UTILITY SOLAR		2,700 MW by Year Eight

All utility-scale solar parks are developed through competitive IPP procurement with standardised Power Purchase Agreements. EPRA sets the feed-in tariff for the first tranche; subsequent tranches are procured through competitive tender as the market matures. The target blended solar tariff at utility scale by Year Five is below USD 0.04/kWh — at this level solar is the cheapest generation in the mix and justifies aggressive capacity expansion.

SECTION FOUR

Hydropower — Unlocked by the Water Programme

4.1 The Water-Energy Nexus

The most important insight in this energy programme is that the water programme and the energy programme are not two separate programmes. They are one programme with two outputs. Every dam the water programme builds generates power. Every irrigation pump the water programme installs creates electricity demand. The pumped storage scheme uses water as a battery. The High Grand Falls Dam on the Tana River is simultaneously Kenya's largest water storage asset and one of its largest power generation assets.

This nexus has been missed in previous planning because the Water Ministry and the Energy Ministry have planned separately. The national programme corrects this through a Water-Energy Nexus Planning Unit that coordinates the two directorates from Year One. A dam designed only for water storage that could generate 800 MW without significant additional civil works cost is a planning failure. The marginal cost of the generating equipment on a dam whose civil works are already budgeted is modest relative to the value of the power output.

Source	Capacity (MW)	Notes
High Grand Falls Dam — Tana River	800	Designed primarily for water storage and irrigation in Maji ya Taifa. Power generation is secondary output but enormous. Power plant built as part of dam construction. Civil works are the dominant cost — the generating equipment is the marginal addition.
Existing Tana cascade optimisation	90	Masinga, Kamburu, Gitaru, Kindaruma, Kiambere — existing 500 MW cascade. Sediment management, generator refurbishment, and operational optimisation recovers 15-20% of capacity lost to aging.
Nzoia River run-of-river	175	Western Kenya. Irrigation intake structures include run-of-river power plants. Irrigation infrastructure is the primary investment; power generation flows from it.
Ewaso Ng'iro small hydro	65	Northern water programme storage infrastructure. Small hydro at dam outlets.

Source	Capacity (MW)	Notes
Mara and lake basin rivers	40	Lake Victoria water security programme intake structures include small hydro.
Small hydro programme — 100+ sites	500	Highland rivers: Mount Kenya, Aberdares, Cherangany, Elgeyo Marakwet. Run-of-river plants of 1-20 MW each. More climate-resilient than large reservoir hydro. Does not depend on full reservoir — runs with the river.
Pumped storage — 3 sites	1,000	See Section 4.2 below. The grid's shock absorber.
TOTAL HYDRO	2,670	More than three times current 820 MW installed hydro capacity.

4.2 Pumped Storage — Water as Battery

Pumped storage hydropower is the most important storage technology in Kenya's generation mix. It uses cheap off-peak electricity — generated by solar during the day and by geothermal at night when demand is low — to pump water from a lower reservoir to a higher one. When peak demand occurs, the water is released through turbines generating power instantly. It is a grid-scale rechargeable battery using water as the storage medium. Kenya's Rift Valley topography — steep escarpments with altitude differences of 500-1,000 metres over short distances — is among the best in the world for pumped storage.

Pumped Storage Site	Specification
Olkaria-Naivasha	Uses the Olkaria geothermal plateau as the upper reservoir area and Lake Naivasha as the lower. Takes surplus geothermal and daytime solar. Releases into the evening peak. 300-500 MW. Doubles as grid stabiliser for the Olkaria-Nairobi transmission corridor.
Turkwel Gorge expansion	The existing Turkwel dam (106 MW) is adapted for pumped storage with a new upper reservoir on the escarpment above. 200-300 MW of additional flexible capacity using the existing dam structure.
Tana Pumped Storage	Uses the High Grand Falls upper reservoir and a new lower pool. 300-400 MW. Integrated with the High Grand Falls power plant design from inception — not retrofitted.

Pumped Storage Site	Specification
Combined pumped storage capacity	800-1,200 MW of fully dispatchable, flexible power. Available within seconds of a grid dispatch instruction. The system's primary tool for managing the variability of solar and wind generation and for meeting sudden demand peaks.

SECTION FIVE

Wind and the Northern Corridor

5.1 The Turkana Wind Resource

Lake Turkana Wind Power at 310 MW is currently Africa's largest wind farm and one of the best wind resources on the continent — average wind speed above 11 m/s consistently, capacity factor above 50%. The northern Rift corridor — Turkana, Marsabit, Samburu — extends this resource significantly. The constraint on expanding northern wind has not been wind quality but transmission — the existing line from Turkana to the national grid is inadequate for the volume of power the resource can generate.

The Turkana-Nairobi High Voltage Direct Current transmission line — described in Section Six — is the single investment that unlocks the northern wind and solar resource. Once built, an additional 800 MW of northern wind capacity is viable within three years. The programme targets 1,500 MW of total wind capacity by Year Ten, of which approximately 1,100 MW is in the northern corridor and 400 MW is at other Rift Valley sites.

Wind generation is naturally complementary to solar: wind is strongest at night and in the early morning when solar is absent or low. This complementarity reduces the storage requirement compared to a solar-only variable generation system. The combination of geothermal baseload, solar daytime generation, and wind nighttime generation creates a generation mix that is significantly more stable than any single variable source.

SECTION SIX

Transmission — The Critical Infrastructure

6.1 The Transmission Gap

Kenya's transmission network is managed by KETRACO and is chronically underfunded relative to the generation programme. The consequence is stranded generation: power plants that exist but cannot deliver their output to where it is needed because the transmission line is at capacity, the wrong voltage, or simply does not exist. The Olkaria-Lessos-Kisumu 400 kV line was the most recent major addition. The northern corridor has no adequate transmission. The ASAL regions have almost none.

Transmission Investment	Specification and Priority
Turkana-Nairobi HVDC Line	1,000 km, 500 kV High Voltage Direct Current, 1,000 MW capacity. The single most important transmission investment in the programme. Enables the northern wind and solar resource. Designated Year One priority. Funded through AfDB concessional loan and EIB climate finance facility. Construction target: commissioned by Year Four.
The Northern Ring	A transmission ring connecting Marsabit, Isiolo, Garissa, Mandera, and Turkana to the national grid. Currently these ASAL towns are on diesel or isolated mini-grids. The ring enables the ASAL solar programme, the ASAL connectivity programme, and the economic development of northern Kenya. 400 kV ring, 500 MW capacity.
Industrial Supply Lines — Dedicated Feeds	Dedicated high-reliability transmission to: Dongo Kundu SEZ (400 kV dedicated feed, 99.95% reliability target — the EAF steel plant cannot operate on a grid with more than 0.05% downtime); Thika Industrial Zone; Eldoret Agro-Industrial Park; the seven HPC locations. Industrial supply lines have automatic switching and backup feeds. Industrial reliability is a separate design specification from the general grid.
EAC Interconnectors	Kenya-Uganda interconnector upgrade: 400 MW capacity (from current 200 MW). Kenya-Tanzania interconnector upgrade: 300 MW. Kenya-Rwanda via Uganda: 200 MW. These are the physical transmission infrastructure of the EAC Power Pool and of Kenya's status as EAC net power exporter by Year Eight.
Last-Mile Distribution Upgrade	The distribution network managed by Kenya Power loses approximately 22% of electricity between transmission and the consumer. A five-year distribution modernisation programme: smart metering for all connections above the minimum domestic tariff;

Transmission Investment	Specification and Priority
	automated fault detection; aerial bundled cable replacement in high-theft urban areas; new distribution transformers for overloaded networks. Target: losses below 12% by Year Eight.

SECTION SEVEN

Rural Electrification — The Development Right

7.1 Three Instruments for the Last Mile

Rural electrification is a development right in this programme — not a commercial decision determined by whether the last-mile connection generates sufficient revenue for Kenya Power. The 25% of Kenyan households currently without electricity are predominantly rural, ASAL, and the same households targeted by every other national programme document. A CRC without electricity is not a CRC. A school without electricity cannot run a computer lab or an ECD centre. A health facility without reliable power cannot store vaccines or run an operating theatre. The electrification programme runs in parallel with every other sector programme's rural infrastructure, not behind it.

Instrument	Application	Target
Grid Extension	Communities within 10 km of an existing distribution line. The economic case for grid extension is improved by the programme demand — a rural CRC, school, and health facility cluster creates enough load to justify a line that would not be viable for household consumption alone.	All communities within 10 km of existing grid connected by Year Six.
Solar Mini-Grid	Communities 10-50 km from the existing grid. Solar generation plus battery storage at village scale, serving 50-500 households and any community facilities. Mini-grids are built and operated by licensed private operators under a REREC viability gap subsidy that covers the capital	500 mini-grids operational by Year Five. 1,000 by Year Eight.

Instrument	Application	Target
	cost gap between the commercially viable tariff and the national tariff standard.	
Off-Grid Solar Home Systems	Dispersed populations beyond viable mini-grid reach. ASAL pastoralist communities. Individual solar home systems providing minimum 50W — enough for lighting, phone charging, and a small television. Distributed through REREC-subsidised channels and through SACCO consumer credit.	200,000 off-grid systems by Year Five. 500,000 by Year Ten.

The universal electrification target: 90% household electricity access by Year Ten, rising to 95% by Year Fifteen. Current national average is approximately 75%, with rural areas at approximately 35-40%. The programme closes this gap through the three-instrument approach, with the instrument chosen by geography and population density rather than by commercial viability alone.

SECTION EIGHT

The Regulatory Reform

8.1 The Institutional Fragmentation Problem

Kenya's energy sector has five major institutions — EPRA, KenGen, KETRACO, Kenya Power, and REREC — plus GDC, KPC (Kenya Pipeline Company), and the nuclear programme body. They plan separately, budget separately, and produce outcomes that do not add up to a coherent system. The generation plan does not align with the transmission plan. The rural electrification plan does not align with either. The industrial tariff is set by Kenya Power's revenue needs rather than by cost-reflective pricing. The programme reforms this through structural separation and institutional clarification.

Institution	Reformed Role
EPRA — Energy and Petroleum Regulatory Authority	Strengthened as the independent sector regulator with genuine tariff-setting authority, operationally independent of political direction. EPRA sets tariffs based on cost-reflective principles plus the explicit domestic subsidy (see below). EPRA publishes all tariff determinations with full cost workings. EPRA's annual

Institution	Reformed Role
	report is tabled in Parliament.
GDC — Geothermal Development Company	Separated from KenGen with a dedicated capitalisation and a single mandate: drill geothermal wells at industrial scale. GDC sells steam to KenGen and private IPPs. GDC does not build power plants. This separation allows the drilling programme to be optimised independently of the generation programme.
KenGen — Kenya Electricity Generating Company	Focuses on state-owned generation assets: geothermal power plants, existing hydropower, and the pumped storage programme. Does not drill wells (GDC does that). Competes with private IPPs for new generation contracts on the basis of its cost competitiveness.
KETRACO — Kenya Electricity Transmission Company	Owns and operates all transmission infrastructure above 132 kV. Has a dedicated capital budget independent of Kenya Power's cash flow — the critical reform that has allowed transmission underfunding to persist. KETRACO's five-year investment plan is published and approved by EPRA, not by the Treasury on an ad hoc basis.
Kenya Power — Distribution and Retail	Structurally separated into: a Distribution Company (regulated monopoly, owns the distribution network) and a Retail Company (competitive, can be challenged by other licensed retailers for large industrial users). Large industrial customers above 1 MW can choose their power retailer. The distribution monopoly is regulated; the retail margin is competitive for large users.
REREC — Rural Electrification and Renewable Energy Corporation	Focused exclusively on the three-instrument rural electrification programme. Has a dedicated rural electrification levy — 0.5% of all electricity sales above the domestic minimum — that funds mini-grid viability gap subsidies and off-grid system distribution. REREC does not compete with KenGen or private IPPs for generation.

8.2 The Industrial Tariff Reform — The Programme Enabler

The industrial electricity tariff is the single most important price in the national programme. The Dongo Kundu steel plant, the agro-processing zones, the Housing Production Centres — their economic viability depends on power at a price that is competitive with alternative locations. Currently Kenya's industrial tariff of

approximately USD 0.13/kWh is more than twice the Egyptian rate and nearly double the South African rate. No manufacturing programme is viable at this price difference.

The current tariff structure uses industrial users to cross-subsidise domestic consumers: industrial users pay above cost so domestic users pay below cost. This is politically convenient and economically disastrous. The reform: a transparent, explicit domestic consumer subsidy funded from the national budget, which allows industrial users to pay cost-reflective tariffs. The subsidy is visible, auditable, and time-limited — as real incomes rise and the minimum tariff becomes commercially viable, the subsidy is progressively reduced.

The Industrial Tariff Pathway
Year One: Industrial tariff reformed to cost-reflective basis. Domestic low-income subsidy made explicit as a budget line item. Transition period: 18 months of tariff adjustment to avoid sudden shock to existing industrial users.
Year Three: Industrial tariff reaches USD 0.08/kWh as geothermal expansion reduces average generation cost.
Year Five: Industrial tariff reaches USD 0.06/kWh as utility-scale solar comes online and the generation mix cost falls further.
Year Seven: Industrial tariff reaches USD 0.05/kWh target — competitive with South Africa and within range of Egypt. Dongo Kundu SEZ and all national programme industrial zones are now cost-competitive on energy.
Year Ten and beyond: Industrial tariff falls further as the geothermal expansion reaches full scale and the average cost of the generation mix continues to decline.

8.3 The Energy Sector Sovereign Protection Act — The Legal Floor

The regulatory reform in Section 8.1 addresses the institutional fragmentation within Kenya's existing energy architecture. The Energy Sector Sovereign Protection Act addresses a different and more fundamental problem: the legal ground on which every future energy contract is made. The Act is not a regulatory instrument — it is a sovereign protection instrument. It changes the substrate of all future energy contracting so that the extraction architecture that operated in previous IPP agreements finds no foothold in any contract signed after commencement.

The Doctrine: Substrate Removal
We do not renegotiate. We change the ground the contracts land on.

Kenya has suffered material harm through energy contracts that exploited information asymmetry, routed disputes to foreign forums, extracted capacity payments for power not delivered, and vested permanent infrastructure in foreign private ownership. The Act removes all three substrates for every contract entered into after its commencement. Existing contracts are not disturbed. The stroke lands on the future, not the past.

Sovereign Term	What It Means for Every Future IPP, PPA, or Energy Contract
Kenyan governing law (mandatory)	No energy contract above Ksh 500M or 5 years may specify foreign governing law. A foreign law clause is void — Kenyan law applies regardless. This closes the legal arbitrage that allowed previous contracts to be governed by English or Singaporean law.
Kenya Energy Tribunal exclusive jurisdiction	No energy contract may contain an arbitration clause, a foreign court clause, or any provision routing disputes to any forum other than the Kenya Energy Tribunal. Any such clause is void. No Kenyan court will enforce a foreign arbitral award arising from a dispute within the Tribunal's exclusive jurisdiction. The ICC London, the ICSID, the Stockholm arbitration — none of them have jurisdiction over any future Kenyan energy contract.
Automatic reversion of generation assets at zero cost	Upon expiry or termination of any energy contract, all generation assets revert automatically to the Republic of Kenya at no cost. No buyout, no equity compensation, no option to purchase. The developer delivers the assets in good operational condition — the maintenance obligation is contractual. This is the provision that most directly addresses the permanent foreign ownership architecture of previous agreements.
Capacity payment cap	Capacity payments cannot exceed the rate prescribed by KECA. Capacity payments are not payable for capacity unavailable due to the developer's own fault. The aggregate capacity payments across all energy contracts in any year cannot exceed 15% of the total electricity generation budget without National Assembly approval.
Change order restrictions	No change order increasing total contract value by more than 10% is valid without KECA approval and independent technical review. Cumulative change orders are capped at 20% of original contract value. Any change order altering the governing law, dispute resolution, reversion, or capacity payment provisions is void regardless of value.
Currency risk sharing (50% maximum to	No contract may transfer exchange rate risk entirely to the state or offtake authority. Risk is shared on the KECA

Sovereign Term	What It Means for Every Future IPP, PPA, or Energy Contract
state)	formula — maximum 50% to the state. The foreign exchange losses that have compounded Kenya's energy bills under previous contracts are closed off.
Tariff transparency within 48 hours	The full tariff structure of every energy contract is published on KECA's public digital platform within 48 hours of execution. Every change order, every tariff review determination, every technical assessment — all published within 48 hours. The opacity that allowed previous capacity payment arrangements to persist undetected for years is eliminated.

The Kenya Energy Contracts Authority (KECA) is established as the sole negotiating body for all energy contracts above these thresholds. KECA is not a regulator — EPRA regulates. KECA negotiates, approves, and monitors, with the technical depth and institutional independence to do so without capture. The Director-General is appointed by the President subject to two-thirds parliamentary confirmation, serves a single non-renewable 6-year term, is compensated at private energy sector market rates, and cannot join an energy developer within 5 years of leaving the Authority. The KECA's budget is a protected appropriation.

The Kenya Energy Tribunal holds exclusive jurisdiction over all disputes under energy contracts covered by this Act. It comprises a High Court President, technical members with energy engineering and finance expertise, and legal members with commercial energy law experience. No foreign arbitral forum has jurisdiction. No London ICC award is enforceable in Kenya if it arises from a dispute within the Tribunal's exclusive jurisdiction. The legal terrain is changed permanently.

Technology transfer is mandatory in all contracts of 15 years or more: 70% Kenyan nationals in operational and technical roles within 5 years of commissioning; all operational manuals, technical specifications, and maintenance protocols shared with KECA within 6 months. A developer may not exit a project until KECA certifies that technology transfer obligations have been substantially met.

9.1 Kenya as Net Exporter

By Year Eight, Kenya's installed generation capacity substantially exceeds its domestic peak demand. The surplus — estimated at 3,000-4,000 MW of firm capacity — is exported to the EAC power pool. This is not charity. It is a commercial relationship that generates revenue for KenGen and KETRACO, deepens EAC energy integration, and gives Kenya structural leverage in EAC negotiations that no political declaration can match.

An EAC member state that depends on Kenyan power for 20% of its industrial supply has a structural interest in Kenya's economic stability and in the functioning of the EAC institutions. Energy interdependence is integration by another name. The EAC power pool is the Diplomasia ya Taifa connectivity vision made physical.

Interconnector	Capacity and Timeline
Kenya-Uganda (upgrade)	400 MW capacity (from current 200 MW). Year Three commission. Uganda's growing industrial demand and the Albertine oil economy create sustained demand for Kenyan power.
Kenya-Tanzania (upgrade)	300 MW capacity. Year Four commission. The Mombasa-Dar energy corridor complements the maritime and road corridor in Diplomasia ya Taifa. Tanzania's Dar es Salaam industrial zone and the SGR extension are the primary demand anchors.
Kenya-Rwanda via Uganda	200 MW. Year Five commission. Rwanda is energy-scarce and paying premium prices for power. Kenyan geothermal electricity delivered to Kigali at USD 0.07/kWh is transformatively competitive against Rwanda's current tariff.
EAC Power Pool revenue	At an export tariff of USD 0.07/kWh, 2,000 MW of sustained export generates approximately USD 1.2 billion per year in electricity export revenue. This is a significant new foreign exchange earner — comparable to tourism — and it grows as the EAC economies industrialise.

SECTION TEN

Climate Finance — Positioning the Transition

10.1 Kenya as Reference Case

Kenya's energy transition — from a thermal-heavy, expensive, under-invested grid to a geothermal-solar-wind system that is clean, cheap, and surplus — is exactly the kind of programme that the global climate finance architecture was designed to fund. The Green Climate Fund, the Climate Investment Funds, bilateral climate finance from the UK, Germany, and Japan, the World Bank's climate facilities — all of these are looking for exactly what Kenya is building: a credible national programme with institutional capacity to deploy capital at scale in renewable energy.

The programme positions Kenya's energy transition as a flagship climate finance recipient — not as a vulnerable country seeking adaptation finance, but as a country with an ambitious, credible, well-designed mitigation programme that deserves priority access to concessional climate capital. The annual Kenya Development Report (from Diplomasia ya Taifa) specifically documents the energy transition's climate finance utilisation, per-unit costs, and outputs. Kenya becomes the reference case for African climate finance deployment.

Climate Finance Instrument	Application in Nishati ya Taifa
Green Climate Fund	Primary funder for the Turkana-Nairobi HVDC line, the Northern Ring, and the ASAL solar parks. GCF concessional loans at 0.25-1.75% for 40-year terms reduce the cost of these capital-intensive investments dramatically relative to commercial financing.
Climate Investment Funds — Scaling Up Renewable Energy	SREP funding for the mini-grid programme and the off-grid solar home system distribution. SREP provides viability gap grants that make rural electrification commercially viable without requiring Kenya Power to cross-subsidise.
EIB Climate Action	The European Investment Bank's climate action window is the primary funder for the geothermal expansion in partnership with GDC. EIB has existing Kenya geothermal relationships from the Olkaria programme.
Bilateral climate finance — UK, Germany, Japan	UK UKEF and BII for the pumped storage programme. German KfW for distribution modernisation. JICA for the small hydro programme (Japan has deep small hydro expertise from its own mountain hydrology).
Carbon markets	Kenya's renewable energy expansion displaces approximately 8-10 million tonnes of CO_2 per year compared to a thermal generation counterfactual. Under the Paris Agreement's Article 6 carbon market mechanisms, this generates tradeable carbon credits. Kenya establishes a National Carbon Registry and sells credits through the voluntary and compliance carbon markets. Revenue directed to REREC's rural electrification fund.

SECTION ELEVEN

Cross-Programme Obligations

[FORTHCOMING] — Full cross-programme amendment schedule specifying the power supply obligation for every relevant programme document. The framework below represents the programme's commitments.

Every national programme document that creates a physical facility is amended to include a power supply specification under Amendment Reference Code NSH/[DOCUMENT]/[NUMBER]. The specification states: the facility's power demand, the connection type (grid, mini-grid, or off-grid solar), the reliability standard, and the commissioning obligation — no facility may be opened without its power connection commissioned. A CRC without electricity is incomplete construction, not a completed CRC.

KRCC road construction projects include a rural electrification co-delivery obligation: wherever a KRCC road project reaches a community currently without grid connection, REREC co-deploys a mini-grid or off-grid system within the same construction window. The road and the electricity arrive together. This is the development coordination principle — infrastructure investments are bundled rather than sequenced over years.

Every national programme industrial licence — for agro-processing, mining, manufacturing, tourism — includes a renewable energy target: a minimum of 30% of the facility's energy consumption from on-site renewable generation (rooftop solar, biogas from waste, small hydro from process water) by Year Five of operation. Industrial facilities that meet this target receive a 0.5% reduction in the industrial tariff as an incentive.

SECTION TWELVE

The Twenty-Year Trajectory

Year	Generation Capacity (MW installed)	Key Milestones
Baseline (current)	2,200 MW reliable / 3,000 MW installed	Peak demand ~2,000 MW. Industrial tariff USD 0.13/kWh. Rural access 35-40%. Transmission losses 22%.
Year 3	4,500 MW	Olkaria expansion complete (+500 MW). First utility solar parks online (Garissa, Kajiado). Turkana-Nairobi HVDC line commissioned. Industrial tariff USD 0.08/kWh.
Year 5	7,200 MW	Menengai and Suswa geothermal online (+800 MW). Solar infrastructure mandate

Year	Generation Capacity (MW installed)	Key Milestones
		producing 800 MW distributed. All utility solar parks under construction. Industrial tariff USD 0.06/kWh. Rural access 75%.
Year 7	10,500 MW	All utility solar parks operational (+2,700 MW). Pumped storage first site operational. Northern wind expansion (+500 MW). High Grand Falls power plant commissioned. Industrial tariff USD 0.05/kWh. Kenya Power surplus begins.
Year 8	12,000 MW	Kenya net exporter to EAC. EAC interconnectors upgraded. Thermal plants fully retired. Transmission losses below 15%.
Year 10	13,930 MW	Northern Rift geothermal Tranche 3 underway. Small hydro programme 400 MW complete. All pumped storage sites operational. Rural access 90%. Transmission losses below 12%. Industrial tariff below USD 0.05/kWh.
Year 15	16,000+ MW	Northern Rift geothermal at full scale. EAC export 3,000+ MW. Kenya the primary power source for the EAC industrial economy.
Year 20	18,000+ MW	The energy transition complete. Kenya is a clean energy surplus economy. No thermal generation. No energy poverty. Industrial tariff the most competitive in Sub-Saharan Africa.

NISHATI YA TAIFA — The National Energy Vision. *WORKING DOCUMENT — Year One.*

This document is the energy foundation for the Kenya National Development Programme. Every programme document that creates a physical facility, an industrial operation, an irrigation scheme, or a digital service assumes the power this document delivers. The Water-Energy Nexus Planning Unit ensures that Maji ya Taifa and Nishati ya Taifa plan jointly. The EAC Power Pool connects to Diplomasia ya Taifa. The climate finance architecture connects to Fedha ya Taifa. The industrial tariff pathway connects to Viwanda ya Taifa and Madini ya Taifa.

PROGRAMME INTEGRATION APPENDIX

Nishati ya Taifa — Energy — Cross-Programme Integration, Employment Summary and Legal Register

A. Employment Summary

Institution / Role	Permanent	Entry-Level	Entry Qualification and Pathway
KenGen permanent staff (geothermal operations)	3,000	800	Plant operators, drilling crews, reservoir monitors — KNQF Level 3–5.
KECA technical staff and Kenya Energy Tribunal	500	100	Energy contract analysts, legal officers, tribunal staff — KNQF Level 6–7.
IPP operational staff (programme-enabled)	8,000	3,000	Solar/wind plant operators, grid technicians — KNQF Level 3–5. Entry via KPLC technical training.
HVDC grid maintenance crews	1,200	800	Grid maintenance technicians — KNQF Level 4–5. New specialisation.

Employment Summary	Figure
Total permanent positions (Year 10 steady state)	~12,700
Entry-level positions (KNQF Level 2–5)	~4,700
Reference — full programme employment register	Programme Integration Index (PII) Section Two

B. Cross-Programme Linkages

Every linkage below names the specific institution, data system, or instrument that creates the interface. Vague references are not listed — only confirmed operational connections.

Links To	Specific Linkage — Institution, Data System, or Instrument at the Interface
Sayansi na Teknolojia	KERI (KRA Institute 4) — energy research: geothermal drilling and reservoir science, solar PV technology and storage, grid integration, HVDC transmission, green hydrogen. Located at Olkaria Geothermal Complex — the research laboratory is a living research environment.
Diplomasia ya Taifa	EAC power pool: Kenya exports 1,000 MW by Year 10 to EAC partners. EASGR (East African Super Grid and Ring) transmission corridor. EAC power pool treaty requires KECA to

	publish all export pricing agreements within 48 hours of execution.
Usafiri wa Taifa	Electric vehicle transition: KRC electrification (Nairobi-Mombasa first), BRT electric buses, KNAC electric ambulance fleet transition from Year 8. Power demand planning coordinates with KRC electrification schedule.
Viwanda ya Taifa	KISC integrated steel mill requires 400 MW dedicated power allocation — the programme's largest single industrial energy consumer. Power supply agreement between KPLC/KenGen and KISC is a KECA-approved contract.
Ulinzi na Usalama	KECA Digital Platform hosting on Wingu la Taifa with NIS monitoring. KMEC builds perimeter security infrastructure at Olkaria geothermal fields and power transmission tower foundations in security-risk areas.
Mazingira ya Taifa	Geothermal environmental monitoring at Olkaria. Solar farm land use planning coordinates with agricultural land use (agrivoltaics). Bamboo carbon credits and renewable energy certificates traded through National Carbon Registry.
Ardhi ya Taifa	Energy infrastructure PILG clearance: power line transmission corridors, substation sites, wind farm sites all cleared through NLC PILG desk.
Mfumo wa Katiba	Energy Sovereign Protection Act — Tier 1 Year 1 legislation. KECA mandatory sovereign terms and Kenya Energy Tribunal are the legal architecture.

C. Legal Instruments and Constitutional Protection

Legal Instrument	Year	Pathway
Energy Sovereign Protection Act (KECA, Tribunal, 7 mandatory terms)	Year 1	Simple majority
Energy Act Amendment — KECA as exclusive negotiator above Ksh 500M	Year 1	Simple majority
Kenya Electricity Generating Company Act Amendment — KenGen SOE governance reform	Year 2	Simple majority

D. Live Metrics and Accountability

Full cross-reference detail: Programme Integration Index (PII) — Sections 1, 2, and 3.
Live metrics: National Governance Dashboard — Energy Module. Daily: installed capacity vs target (13,930 MW by Year 10), EAC power export volume and revenue. Monthly: KECA contract registry (all contracts within 48 hours of execution). Annual: KECA sovereign terms compliance audit published.